Yushun Dong

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Education Experiences

University of Virginia (UVa) Charlottesville, USA

Ph.D. Candidate, Department of Electrical and Computer Engineering *Jan. 2020 – May 2024 (Expected)*

- **Advisor:** Prof. Jundong Li
- **Citation Statistics:** 534 (citations), 12 (h-index), 14 (i10-index), from Google Scholar by February 2024.

Beijing University of Posts and Telecommunications (BUPT) Beijing, China

B.S. in Telecommunication Engineering *Sep 2015 – Jun 2019*

- Graduated with **Excellent Bachelor Thesis (Top 0.5%)**.

Research Interest

I am broadly interested in **graph machine learning** to advance the frontiers of graph data analysis, including deep graph neural networks, graph representation learning, and their real-world applications (e.g., recommendation and epidemic prediction). I am particularly interested in how to achieve **responsible graph mining** algorithms to **benefit social good**, and I perform abundant research in related areas, such as advancing the explainability, algorithmic fairness, and robustness of deep learning on graphs.

Publications and Patent

LEADING-AUTHOR PUBLICATIONS

[1] **Yushun Dong**, Jing Ma, Song Wang, Chen Chen and Jundong Li, *Fairness in Graph Mining: A Survey*, IEEE Transactions on Knowledge and Data Engineering (TKDE) 2023.

Notable paper:

It is the first work that presents progress on formulating and achieving algorithmic fairness in graph mining.

It has gained 46 citations within the same year of publication (as of Nov. 10th, 2023).

It has been widely cited in literature beyond the realm of graph mining and has been invited for presentation at the Mila - Quebec AI Institute.

[2] **Yushun Dong**, Tobias Schnabel and Jundong Li, *When Newer is Not Better: Does Deep Learning Really Benefit Recommendation From Implicit Feedback?*, SIGIR 2023 (Acceptance Rate: 20.1%).

[3] **Yushun Dong**, Binchi Zhang, Yiling Yuan, Na Zou, Qi Wang, Jundong Li, *RELIANT: Fair Knowledge Distillation for Graph Neural Networks*, SDM 2023 (Acceptance Rate: 22.9%).

[4] **Yushun Dong**, Song Wang, Jing Ma, Ninghao Liu, Jundong Li, *Interpreting Unfairness in Graph Neural Networks via Training Node Attribution*, AAAI 2023 (Acceptance Rate: 19.6%).

[5] **Yushun Dong**, Song Wang, Yu Wang, Tyler Derr, Jundong Li, *On Structural Explanation of Bias in Graph Neural Networks*, SIGKDD 2022 (Acceptance Rate: 14.9%).

[6] **Yushun Dong**, Ninghao Liu, Brian Jalaian, Jundong Li, *EDITS: Modeling and Mitigating Data Bias for Graph Neural Networks*, TheWebConf 2022 (Acceptance Rate: 17.7%).

Notable paper:

It proposes the first learning framework that mitigates the bias encoded in both node attributes and graph topology for Graph Neural Networks.

It has gained 64 citations (as of Nov. 10th, 2023).
It is mentioned in the Tutorial on the 1st Learning on Graphs Conference 2022 given by Prof. Edwin Hancock (from New York University) et al.

[7] **Yushun Dong**, Kaize Ding, Brian Jalaian, Shuiwang Ji, Jundong Li, *Graph Neural Networks with Adaptive Frequency Response Filter*, CIKM 2021 (Acceptance Rate: 21.7%).

[8] **Yushun Dong**, Jian Kang, Hanghang Tong, Jundong Li, *Individual Fairness for Graph Neural Networks: A Ranking based Approach*, SIGKDD 2021 (Acceptance Rate: 15.4%).
Notable paper:
It is the first work that proposes the ranking-based individual fairness notion for graph mining algorithms.
It has gained 78 citations (as of Nov. 10th, 2023).
It has been widely reported by tutorials at different top-tier conferences, e.g., SIGKDD, ICDM, LOG.

[9] **Yushun Dong**, Yingxia Shao, Xiaotong Li, Sili Li, Lei Quan, Wei Zhang, Junping Du, *Forecasting Pavement Performance with a Feature Fusion LSTM-BPNN Model*, CIKM 2019 (Acceptance Rate: 19.4%).

[10] **Yushun Dong**, Jing Ma, Chen Chen, Jundong Li, *Fairness in Graph Mining: Metrics, Algorithms, and Applications (Tutorial)*, ICDM 2022.

[11] **Yushun Dong**, Oyku Deniz Kose, Yanning Shen and Jundong Li, *Fairness in Graph Machine Learning: Recent Advances and Future Prospectives (Tutorial)*, SIGKDD 2023.

COLLABORATED PUBLICATIONS

[1] Binchi Zhang, **Yushun Dong**, Chen Chen, Yada Zhu, Minnan Luo and Jundong Li, *Adversarial Attacks on Fairness of Graph Neural Networks*, ICLR 2024.

[2] Xianren Zhang, Jing Ma, **Yushun Dong**, Chen Chen, Min Gao and Jundong Li, *SD-Attack: Targeted Spectral Attacks on Graphs*, PAKDD 2024.

[3] Xingbo Fu, Binchi Zhang, **Yushun Dong**, Chen Chen, Jundong Li, *Federated Graph Machine Learning: A Survey of Concepts, Techniques, and Applications*, SIGKDD Explorations.

[4] Yucheng Shi, **Yushun Dong**, Qiaoyu Tan, Jundong Li and Ninghao Liu, *GiGaMAE: Generalizable Graph Masked Autoencoder via Collaborative Latent Space Reconstruction*, CIKM 2023 (Acceptance Rate: 24%).

[5] Jihong Wang, Minnan Luo, Jundong Li, Yun Lin, **Yushun Dong**, Jin Song Dong and Qinghua Zheng *Empower Post-hoc Graph Explanations with Information Bottleneck: A Pre-training and Fine-tuning Perspective*, SIGKDD 2023 (Acceptance Rate: 22.1%).

[6] Rong Ding, **Yushun Dong**, Daniel Aldrich, Jundong Li, Kelsey Pieper and Qi Wang, *Post Disaster Private Well Water Contamination with Geosocial Network*, I3CE 2023.

[7] Xingbo Fu, Chen Chen, **Yushun Dong**, Anil Vullikanti, Eili Klein, Gregory Madden and Jundong Li, *Spatial-Temporal Networks for Antibiogram Pattern Prediction*, IEEE-ICHI 2023 (Acceptance Rate: 30%).

[8] Song Wang, **Yushun Dong**, Kaize Ding, Chen Chen, Jundong Li, *Few-shot Node Classification with Extremely Weak Supervision*, WSDM 2023 (Acceptance Rate: 17.8%).

[9] Xingbo Fu, Binchi Zhang, **Yushun Dong**, Chen Chen, Jundong Li, *Federated Graph Machine Learning: A Survey of Concepts, Techniques, and Applications* **(Spotlight)**, FedGraph Workshop in CIKM 2022.

[10] Weihao Song, **Yushun Dong**, Ninghao Liu, Jundong Li, *GUIDE: Group Equality Informed Individual*

Fairness in Graph Neural Networks, SIGKDD 2022 (Acceptance Rate: 14.9%).

[11] Yu Wang, Yuying Zhao, **Yushun Dong**, Huiyuan Chen, Jundong Li, Tyler Derr, *Fair View Graph Neural Network for Fair Node Representation Learning*, SIGKDD 2022 (Acceptance Rate: 14.9%).

[12] Song Wang, **Yushun Dong**, Xiao Huang, Chen Chen, Jundong Li, *FAITH: Few-Shot Graph Classification with Hierarchical Task Graphs*, IJCAI 2022 (Acceptance Rate: 15.0%).

[13] Zheng Huang, Jing Ma, **Yushun Dong**, Natasha Zhang Foutz, Jundong Li, *Empowering Next POI Recommendation with Multi-Relation Modeling*, SIGIR 2022 (Acceptance Rate: 24.7%).

[14] Jing Ma, **Yushun Dong**, Zheng Huang, Daniel Mietchen, Jundong Li, *Assessing the Causal Impact of COVID-19 Related Policies on Outbreak Dynamics: A Case Study in the US*, TheWebConf 2022 (Acceptance Rate: 17.7%).

[15] Zhiming Xu, Xiao Huang, Yue Zhao, **Yushun Dong**, Jundong Li, *Contrastive Attributed Network Anomaly Detection with Data Augmentation*, PAKDD 2022 (Acceptance Rate: 19.3%).

[16] Xiao Wang, Quan Yuan, Zhihan Liu, **Yushun Dong**, Xiaojuan Wei, Jinglin Li, *Learning Route Planning from Experienced Drivers Using Generalized Value Iteration Network*, IOV 2019.

SUBMISSIONS UNDER REVIEW

[1] **Yushun Dong**, Binchi Zhang, Hanghang Tong and Jundong Li, *ELEGANT: Certified Defense on the Fairness of Graph Neural Networks*, under review of ICML 2024.

[2] **Yushun Dong**, Yozen Liu, Jundong Li, Tong Zhao and Neil Shah, *SEESAW: Are Graph Neural Networks Improving Node Representation Learning for All?*, under review of ICML 2024.

[3] **Yushun Dong**, Binchi Zhang, Zhenyu Lei, Na Zou and Jundong Li, *IDEA: A Flexible Framework of Certified Unlearning for Graph Neural Networks*, under review of SIGKDD 2024.

[4] Zaiyi Zheng, **Yushun Dong**, Song Wang and Jundong Li, *LLM-CF: Large Language Model Guided Context Filtering for Knowledge Graph Completion*, under review of ACL 2024.

[5] Binchi Zhang, **Yushun Dong**, Tianhao Wang and Jundong Li, *Towards Certified Unlearning for Deep Neural Networks*, under review of ICML 2024.

[6] Song Wang, **Yushun Dong**, Xiao Huang, Chen Chen and Jundong Li, *Learning Hierarchical Task Structures for Few-shot Graph Classification* , under review of TKDD.

[7] Zhixun Li, **Yushun Dong**, Qiang Liu and Jeffrey Xu Yu, *Rethinking Fair Graph Neural Networks from Re-balancing*, under review of SIGKDD 2024.

[8] Xingbo Fu, Song Wang, **Yushun Dong**, Binchi Zhang, Chen Chen and Jundong Li, *Federated Graph Learning with Graphless Clients*, under review of UAI 2024.

[9] Yinhan He, Zaiyi Zheng, Yaochen Zhu, Patrick Soga, **Yushun Dong** and Jundong Li, *Explaining Graph Neural Networks with Large Language Models: A Counterfactual Perspective*, under review of SIGKDD 2024.

[10] Haochen Liu, Song Wang, Yaochen Zhu, **Yushun Dong** and Jundong Li, *Knowledge Graph-Enhanced Large Language Models via Path Selection*, under review of ACL 2024.

PATENT

[1] **Yushun Dong**, Chao Sang, Zhiyuan Tao, Yuan Zheng, Silei Wu and Wensheng Sun, *Holographic projection auxiliary teaching method, device, and system with remote interactive functionality*,

CN108734792B, 2020.11.

Grant Writing

I have contributed to the writing of the following grants during my PhD program:

NSF: CAREER Award: "CAREER: Toward A Knowledge-Guided Framework for Personalized Decision Making", $600,000.00, NSF #2144209, 09/1/2022 - 08/31/2027. PI: Jundong Li. I contributed to the following sections: Research Objectives, Research Plan, Research Objective 1 - Leveraging Relational Knowledge for Causal Inference, Research Objective 2 - Exploring Meta Knowledge for Causal Inference.

Cisco Faculty Research Award: "From Macro to Micro: Fairness-Aware Graph Neural Networks", 8/24/2021 - 10/1/2023. PI: Jundong Li. This grant is based on my works on fairness-aware Graph Neural Networks and I contributed to most proposed research objectives and proposed tasks.

Other: Commonwealth Cyber Initiative (CCI) Research grant: "Attacking and Securing Algorithmic Fairness in Human Machine Interactions: A Cross-Disciplinary Framework", 12/1/2022 - 12/31/2023. PI: Jundong Li. I contributed to the following sections: Research Objectives, Research Plan.

Research Experiences

University of Virginia Charlottesville, USA

Ph.D. Student and Research Assistant; Advisor: Prof. Jundong Li *Jan. 2020 – May 2024 (Expected)*

- Explored the trustworthiness of Graph Neural Networks with a particular focus on algorithmic fairness.
- Proposed principled learning algorithms to tackle the theoretical and practical challenges for GNNs.
- Published **20+ research papers and tutorials at top-tier conferences and journals**; Eight submissions under review and multiple in processing.

Snap Research Seattle, USA

Research Intern; Advisor: Dr. Neil Shah & Dr. Tong Zhao *June 2023 – Sept. 2023*

- Performed comprehensive comparison between shallow graph embedding methods and deep learning based methods both theoretically and experimentally.
- Identified key disadvantages in popular deep learning methods, and proposed strategies for effective mitigation.
- Research paper submission about a comparative study between the two types of methods to **ICML 2024**.

Microsoft Research Redmond, USA

Research Intern; Advisor: Dr. Tobias Schnabel *June 2022 – Sept. 2022*

- Developed a unified pipeline to evaluate the performance of existing neural and non-neural based recommendation models in multiple perspectives, including memorization, generalization, and instance-specific utility.
- Implemented popular recommendation baselines; performed comprehensive experiments on 9 real-world datasets.
- A research paper contributing to benchmarking existing recommendation models is **accepted by SIGIR 2023**.

Engineering and Teaching Experiences

Open Source Library: PyGDebias Charlottesville, USA

- PyGDebias features for built-in datasets and implementations of popular fairness-aware graph mining algorithms for the study of algorithmic fairness on graphs.
- Provides a systematic schema to load datasets and compare debiasing techniques for graph learning algorithms.
- 26 graph datasets (including 24 commonly used ones and two newly constructed ones) are collected, and 13 algorithms are implemented in this library.

Teaching Assistant Charlottesville, USA

- 2021 Fall, Graduate: ECE 6501 & CS 6501 Convex Optimization, University of Virginia.
- 2021 Spring, Undergraduate & Graduate: ECE 4502/6502 & CS 6501 Graph Mining, University of Virginia.
- 2020 Spring, Undergraduate & Graduate: ECE 4502/6502 & CS 6501 Graph Mining, University of Virginia.

Mentored Students

Patrick Soga (Ph.D. Student in CS @UVa, Aug. 2023 - Current): Exploring to improve the performance of Graph Neural Networks (GNNs) in terms of Spectral Graph Theory. **One paper submission to SIGKDD 2024**.

Zaiyi Zheng (Ph.D. Student in EE @UVa, Aug. 2023 - Current): Investigating to benefit reinforcement learning with Large Language Model (LLM) on knowledge graph completion tasks.**One paper submission to ACL 2024**.

Zhenyu Lei (Ph.D. Student in EE @UVa, Aug. 2023 - Current): Investigating novel predictive tasks over spatial-temporal graphs with Graph Neural Networks (GNNs). **One paper submission to SIGKDD 2024**.

Alexi Gladstone (Undergrad in CS @UVa, Apr. 2023 - Current): Investigating self-supervised learning related topics based on graph learning algorithms.

Yinhan He (Ph.D. Student in EE @UVa, Jan. 2023 - Current): Exploring to benchmark the performance of Graph Neural Networks (GNNs) in the spectral domain. **One paper submission to SIGKDD 2024**.

Binchi Zhang (Ph.D. Student in CPE @UVa, Sept. 2022 - Current): Contributing to the adversarial attacks on the fairness of Graph Neural Networks (GNNs). **One ICML 2024 submission; One ICLR 2024 acceptance**.

Xingbo Fu (Ph.D. Student in CPE @UVa, Sept. 2022 - Current): Investigating multiple topics related to federated learning based on Graph Neural Networks (GNNs). **One paper accepted by SIGKDD Explorations**.

Alex Jing Huang (Undergrad in CS @UVa, Oct. 2022 - Current): Contributing to benchmarking existing fairness-aware Graph Neural Networks (GNNs).

Xianren Zhang (Undergrad in EE @University of Cincinnati, Oct. 2022 - Current): Studying the adversarial attacks on Graph Neural Networks (GNNs) in the spectral domain. **One paper acceptance by PAKDD 2024**.

Yiling Yuan (Undergrad in CS @BUPT, Mar. 2022 - Jan. 2023): Studying bias mitigation approaches in graph learning under the context of knowledge distillation. **One paper accepted by SDM 2023**.

Pranav Bangarbale (Undergrad in CS @UVa, Sept. 2021 - Current): Investigating individual fairness related research problems in graph learning algorithms.

Mike Song (Quantitative researcher @J.P. Morgan, Mar. 2021 - Mar. 2022): Fulfilling individual fairness among different demographic subgroups in graph learning algorithms. **One paper accepted by SIGKDD 2022**.

Eric Xuanjia Bi (Undergrad in EE & CPE @UVa, June 2021 - Dec. 2022): Contributing to the realization of bias mitigating strategies in terms of group fairness for Graph Neural Networks.

Song Wang (Ph.D. Student in EE @UVa, Sept. 2020 - Current): Investigating multiple topics related to few-shot learning on Graph Neural Networks (GNNs). **One paper accepted by AAAI 2023**.

Srimanth Tangedipalli (Undergrad in CS @UVa, Sept. 2020 - May 2022): Contributing to the data collection based on social networks.

Kerui Huang (Undergrad in CS @UVa, Oct. 2020 - Oct. 2021): Contributing to comparing the performance between existing fairness-aware Graph Neural Networks (GNNs).

Deepaloke Chattopadhyay (M.S. in CS @UVa, Feb. 2020 - June 2020): Studying spatial-temporal Point-of-Interest recommendations.

Zheng Huang (M.S. in CS @UVa, Feb. 2020 - Sept. 2021): Studying spatial-temporal Point-of-Interest recommendations. **One paper accepted by SIGIR 2022**.

Awards and Honors (6 highlighted out of total 25)

Louis T. Rader Graduate Research Award (Apr. 2023): Awarded by the Charles L. Brown Department of Electrical and Computer Engineering of University of Virginia: this award recognizes the graduate student who has demonstrated outstanding: (1) academic performance, (2) work ethic, and (3) collegiality, in their later stages of study. Only one awardee at the Charles L. Brown Department of Electrical and Computer Engineering of University of Virginia.

Endowed Fellowship (Nov. 2022): Awarded by the Charles L. Brown Department of Electrical and Computer Engineering of University of Virginia: a recognition of the awarded Ph.D. students for academic performance, research productivity (publications and presentations), and awards/honors received, as well as other measures of excellence.

Best Poster (Runner-Up) of SDM Doctoral Forum (Apr. 2022): Awarded to the participant to recognize an outstanding researcher who embodies a holistic combination of research excellence, effective visual communication, and exceptional presentation skills. Only two awardees among all presenters.

McVey Fellowship (Sept. 2021): A recognition of the awarded Ph.D. students for their academic excellence. Only two awardees at the Charles L. Brown Department of Electrical and Computer Engineering of University of Virginia.

Excellent Bachelor Thesis of BUPT (June 2019): Awarded to graduating students who achieve excellence on their Bachelor Thesis. Only awarded to top 0.5% graduating students at BUPT.

National Scholarship of BUPT (Sept. 2017): Awarded to students who achieve significant excellence on their personal development. Only awarded to top 0.5% students at BUPT.

Talks and Presentations

Invited Talk at Snap Inc. (Oct. 2023): Presentation on a comparative study between shallow embedding methods and Graph Neural Networks: how to characterize their primary differences and how to mitigate disadvantages of both.

Tutorial at SIGKDD (Aug. 2023): A systematic introduction over the algorithmic fairness issues in graph machine learning algorithms, including fairness metrics, theoretical analysis, and bias mitigating strategies.

Talk at UVA Data Science Department Datapalooza (Nov. 2022): Presentation on the algorithmic fairness issues in graph mining algorithms.

Talk at Commonwealth Cyber Initiative's Annual CCI Symposium (Apr. 2023): Presentation introducing a systematical understanding of the exhibited bias in Graph Neural Networks in terms of graph topology.

Talk at UVA SYS and SEAS Research Symposiums (Mar. 2023): Presentation introducing methodologies to understand the bias exhibited by Graph Neural Networks.

Invited Talk at the University of Virginia (Feb. 2023): Presentation on a seminar introducing artificial intelligence: *Artificial Intelligence: What Do We Have and Where We Are Heading?*

Invited Talk at the University of Texas Rio Grande Valley (Feb. 2023): Presentation on my research works: *Unlocking Ethical Graph Neural Networks* (Host: Prof. Yifeng Gao & Prof. Li Zhang).

Tutorial at ICDM (Dec. 2022): Presentation on the algorithmic fairness issues in graph mining algorithms.

Talk at UVA Data Science Department Datapalooza (Nov. 2022): Presentation on the algorithmic fairness issues in graph mining algorithms.

Invited Talk at Mila Quebec AI Institute (Sept. 2022):*Fairness in Graph Mining: Metrics and Algorithms.*

Talk at Microsoft Research (Aug. 2022): Presentation on benchmarking recommendation algorithms in strong generalization setting and comparison between neural models and non-neural ones.

Presentation at SDM Doctoral Forum (Apr. 2022): Presented my work *EDITS: Modeling and Mitigating Data Bias for Graph Neural Networks.*

Presentation at SDM Doctoral Forum (Apr. 2021): Presented my work *Individual Fairness for Graph Neural Networks: A Ranking based Approach.*

Invited Talk at the University of Virginia (Mar. 2021): Delivered a presentation introducing gradient-based optimization techniques in *Graph Mining* class (Host: Prof. Jundong Li).

Professional Services

Invited Program Committee Member: AAAI 2024, 2023, 2022; SIGKDD 2023, 2022; SDM 2024, 2023, 2022; etc.

Invited Reviewer & External Reviewer: SIGKDD, SIGIR, ICML, WWW, ICLR, NeurIPS, TKDE, TKDD, etc.

Session Chair & Volunteer: SIGKDD 2023, 2022, 2021, 2020; SDM 2023; WWW 2022; IJCAI 2021; etc.